IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application. No: 10/059,726	§	
Filed: January 29, 2002	§	Atty. Dkt. No: 5150-64400
Inventor(s): Sundeep Chandhoke, David Whatley and Denise Riedlinger	§	
Title: SYSTEM AND METHOD FOR PREVIEWING A SEQUENCE OF MOTION CONTROL OPERATIONS	§	
Examiner: Pitaro, Ryan F.	§	
Group/Art Unit: 2174	§	

APPEAL BRIEF

Box: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Dear Sir/Madam:

Further to the Notice of Appeal filed July 12, 2006 and the Notice of Non-Compliant Appeal Brief mailed July 6, 2007, Appellant presents this amended Appeal Brief. Appellant respectfully requests that this appeal be considered by the Board of Patent Appeals and Interferences.

I. REAL PARTY IN INTEREST

The subject application is owned by National Instruments Corporation, a corporation organized and existing under and by virtue of the laws of the State of Delaware, and having its principal place of business at 11500 N. MoPac Expressway, Bldg. B, Austin, Texas 78759-3504.

II. RELATED APPEALS AND INTERFERENCES

No related appeals or interferences are known which would directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF CLAIMS

Claims 1-49 stand rejected and are the subject of this appeal. A copy of the claims incorporating entered amendments is included in the Claims Appendix hereto.

IV. STATUS OF AMENDMENTS

All amendments have been entered. No amendments have been filed subsequent to the amendment of December 1, 2005. The Claims Appendix hereto reflects the current state of the claims.

V. SUMMARY OF THE INDEPENDENT CLAIMS

The present claims relate generally to the field of computer-based motion control, which involves precisely controlling the movement of a device or system (*See Description of the Related Art, p. 1*).

More particularly, claim 1 relates to a computer-implemented method for previewing cumulative movement of two or more motion control operations. The method comprises receiving user input selecting the two or more motion control operations. (*See, for example, block 403 of Figure 4; p. 22, lines 7-9*). The motion control operations are operable to perform motion control of a hardware device. (*See, for example, p. 15, lines 26-29; p. 22, lines 28-30*). The method further comprises storing information representing the two or more motion control operations. (*See, for example, p. 22, lines 19-21*).

The method further comprises displaying a first preview window for previewing cumulative motion control performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 29, lines 4-8; p. 32, lines 26-30*). Information which visually indicates the cumulative motion control performed by the two or more motion control operations is displayed in the first preview window. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*). Visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*).

Independent claim 32 recites a computer-implemented method for previewing a sequence of motion control operations, with similar limitations as claim 1. The method comprises creating the sequence of motion control operations. (*See, for example, block 403 of Figure 4; p. 22, lines 7-9*). The sequence of motion control operations comprises

one or more operations operable to perform motion control of a hardware device. (*See, for example, p. 15, lines 26-29; p. 22, lines 28-30*).

The method further comprises displaying a first preview window for previewing cumulative motion control performed by the sequence of motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 29, lines 4-8; p. 32, lines 26-30*). Information which visually indicates the cumulative motion control performed by the sequence of motion control operations is displayed in the first preview window. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*). Visually indicating the cumulative motion control performed by the sequence of motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the sequence of motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*).

Independent claim 43 recites a memory medium comprising executable program instructions. (*See, for example, floppy disks 104 of FIGs. 2A-2B; main memory 166 of FIG. 3; p. 12, lines 24-28*). The program instructions are executable to receive user input selecting two or more motion control operations. (*See, for example, block 403 of Figure 4; p. 22, lines 7-9*). The motion control operations are operable to perform motion control of a hardware device. (*See, for example, p. 15, lines 26-29; p. 22, lines 28-30*). The program instructions are further executable to store information representing the two or more motion control operations. (*See, for example, p. 22, lines 19-21*).

The program instructions are further executable to display a first preview window for previewing cumulative motion control performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 29, lines 4-8; p. 32, lines 26-30*). Information which visually indicates the cumulative motion control performed by the two or more motion control operations is displayed in the first preview window. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines*

4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31). Visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*).

Independent claim 45 recites a system comprising a processor (*see, for example, CPU 160 of FIG. 3; p. 12, lines 9-10; p. 19, lines 21-23*), a memory storing program instructions (*see, for example, main memory 166 of FIG. 3; p. 19, lines 23-27*), a display device (*see, for example, display screen of computer system 82 in FIG. 1; p. 15, line 22; video display subsystem 180 of FIG. 3; p. 20, lines 9-10*), and a motion control device (*see, for example, motion control device 136 of FIGs. 2A-2B; p. 15, line 25*).

The processor is operable to execute the program instructions stored in the memory to receive user input selecting two or more motion control operations. (*See, for example, block 403 of Figure 4; p. 22, lines 7-9*). The motion control operations are operable to control the motion control device. (*See, for example, p. 15, lines 26-29; p. 22, lines 28-30*). The processor is further operable to execute the program instructions to store information representing the two or more motion control operations (*See, for example, p. 22, lines 19-21*).

The processor is further operable to execute the program instructions to display a first preview window on the display device for previewing cumulative motion control performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 29, lines 4-8; p. 32, lines 26-30*). Information which visually indicates the cumulative motion control performed by the two or more motion control operations is displayed in the first preview window. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*). Visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations. (*See, for*

example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31).

Independent claim 46 is a system claim. The system comprises a motion control device (*see, for example, motion control device 136 of FIGs. 2A-2B; p. 15, line 25*). The system further comprises means for receiving user input selecting two or more motion control operations. (*See, for example, computer system of FIG. 3, including CPU 160 and main memory 166 storing executable program instructions; Also see, e.g., block 403 of Figure 4; p. 22, lines 7-9*). The motion control operations are operable to control the motion control device. (*See, for example, p. 15, lines 26-29; p. 22, lines 28-30*). The system further comprises means for storing information representing the two or more motion control operations (*See, for example, computer system of FIG. 3, including CPU 160 and main memory 166 storing executable program instructions; Also see, e.g., p. 22, lines 19-21*).

The system further comprises means for displaying a first preview window for previewing cumulative motion control performed by the two or more motion control operations. (*See, for example, computer system of FIG. 3, including CPU 160 and main memory 166 storing executable program instructions; Also see, e.g., two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 29, lines 4-8; p. 32, lines 26-30*). The system further comprises means for displaying information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations. (*See, for example, computer system of FIG. 3, including CPU 160 and main memory 166 storing executable program instructions; Also see, e.g. two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*). Visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations. (*See, for example, two-dimensional view 608 and three-dimensional view 610 of FIGs. 6A-6F; p. 26, lines 28-31; p. 29, lines 4-8; p. 32, lines 26-30; p. 33, lines 3-9; p. 33, lines 28-31*).

VI. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 1-5, 7, 9, 10, 13, 17-34, and 39-49 stand rejected under 35 U.S.C. 103(a) as being unpatentable over the Compumotor Motion Builder Start-up Guide and Tutorial (hereinafter "Compumotor") in view of U.S. Patent No. 5,781,505 to Rowland (hereinafter "Rowland").

Claims 6, 14-16, and 36-38 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Compumotor and Rowland in view of U.S. Patent Application Publication No. 2002/0067373 to Roe et al. (hereinafter "Roe").

Claims 8, 11-12, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Compumotor and Rowland in view of U.S. Patent No. 6,298,474 to Blowers et al. (hereinafter "Blowers").

VII. ARGUMENT

Claims 1-5, 7, 9, 10, 13, 17-34, and 39-49 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Compumotor in view of Rowland. Appellant respectfully traverses these rejections for the following reasons.

Independent claims 1, 32, 43, 45, and 46

Claim 1 recites a computer-implemented method for previewing two or more motion control operations, the method comprising in pertinent part, "displaying information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations." The Examiner admits that, "Compumotor fails to distinctly point out visually indicating a spatial trajectory performed by the two or more motion control operations" but asserts that Rowland combines with Compumotor to render the subject matter of claim 1 *prima facie* obvious under 35 U.S.C. 103(a).

However, Appellant respectfully submits that Compumotor and Rowland do not combine to form a case of *prima facie* obviousness for several reasons. Appellant first respectfully reminds the Board that, "In order to rely on a reference as a basis for rejection of an applicant's invention, the reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the inventor was concerned." *In re Oetiker*, 977 F.2d 1443, 1446, 24 USPQ2d 1443, 1445 (Fed. Cir. 1992). See also *In re Deminski*, 796 F.2d 436, 230 USPQ 313 (Fed. Cir. 1986); *In re Clay*, 966 F.2d 656, 659, 23 USPQ2d 1058, 1060-61 (Fed. Cir. 1992).

Rowland relates generally to a projectile trajectory and source location system that operates to identify, localize, and display the trajectory of a projectile and the source from which the projectile has been launched or fired (see Abstract, See Col. 1, lines 13-22, and Col. 3, lines 35-55). For example, Rowland teaches that the trajectory of a bullet or other supersonic projectile may be identified and shown on a display to an observer,

such as a police officer or soldier, attempting to locate the source of the projectile (see Col. 3, lines 35-55 and FIGs. 3A-3C).

In contrast, the present invention relates to the field of computer-based motion control. As described in the Description of the Related Art of the present application,

> Computer-based motion control involves precisely controlling the movement of a device or system. Computer-based motion control is widely used in many different types of applications, including applications in the fields of industrial automation, process control, test and measurement automation, robotics, and integrated machine vision, among others. A typical computer-based motion system includes components such as the moving mechanical device(s), a motor with feedback and motion I/O, a motor drive unit, a motion controller, and software to interact with the motion controller. (*p. 1, lines 7-14*)

More particularly, claim 1 relates to a method for previewing cumulative movement of two or more motion control operations, i.e., computer-controlled operations that precisely move a device. This may enable a user to see a preview or simulation of the movement without the movement actually being performed, e.g., by visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations in a preview window.

Rowland is entirely unrelated to the field of computer-based motion control and thus is not in the field of Applicant's endeavor. Furthermore, Rowland pertains to an entirely different problem than the particular problem with which the inventors in the present application were concerned. As described above, Rowland pertains to the problem of identifying and displaying the trajectory of a projectile that has been fired. Appellant respectfully submits that Rowland is not reasonably pertinent to the subject matter recited in the present claims. Appellant thus submits that it is improper to rely on Rowland as a basis for rejection of the present claims.

Furthermore, Appellant also submits that Compumotor and Rowland, taken either singly or in combination, do not teach the above-recited features of, "displaying information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations." As noted above, Rowland is entirely

unrelated to the field of motion control and does not even teach the concept of a motion control operation operable to perform motion control of a hardware device. Thus, Rowland certainly does not teach displaying information in a preview window which visually indicates the cumulative motion control performed by two or more motion control operations, and for that matter, does not teach displaying information of any kind related to motion control operations. As admitted by the Examiner, Compumotor also fails to teach the above-recited features. Appellant respectfully submits that the references, taken either singly or in combination, simply do not teach all of the limitations recited in claim 1.

Appellant also notes that in order to establish a *prima facie* case of obviousness, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. There must also be a reasonable expectation of success. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, and not based on applicant's disclosure.

Appellant respectfully submits that neither of these criteria are met. The Examiner does not cite any evidence of a suggestion or motivation found in the references, or in the knowledge generally available to one of ordinary skill in the art, to modify the references or to combine the reference teachings. Instead, the Examiner merely asserts that,

> However, Rowland teaches previewing spatial trajectory for a projectile from a viewpoint of an observer (Column 1 lines 60-67). Therefore it would have been obvious to an artisan at the time of the invention to combine the motion control operations of Compumotor and the spatial trajectory preview of Rowland. Motivation to do so would have been to calculate an accurate range, motion, and speed of the trajectory.

Appellant submits that it is not at all clear how combining the motion control operations of Compumotor with Rowland would result in calculating an accurate range, motion, and speed of Rowland's trajectory as asserted by the Examiner, or how a motion control operation is even applicable in any way to Rowland's system. Thus, Appellant

submits that there is no motivation or reasonable expectation of success for making the combination proposed by the Examiner.

Thus, for at least the reasons set forth above, Appellant respectfully submits that independent claim 1 is patentably distinct over Compumotor and Rowland. Inasmuch as the other independent claims 32, 43, 45, and 46 recite similar limitations as those discussed above with reference to claim 1, Appellant submits that the other independent claims are also patentably distinct over Compumotor and Rowland, for reasons similar to those discussed above.

Since the independent claims are patentably distinct, Appellant respectfully submits that the dependent claims are also patentably distinct, for at least this reason. Appellant further submits that numerous ones of the dependent claims recite further distinctions not taught by the cited references, as discussed below.

Claims 2, 33, and 44

Claim 2 is separately patentable because the cited references do not teach or suggest the limitations of,

> receiving user input to the first preview window to graphically change the cumulative motion control performed by the two or more motion control operations;
>
> changing one or more of the motion control operations in order to change the cumulative motion control performed by the motion control operations in accordance with the user input; and
>
> updating the displayed spatial trajectory in the first preview window in order to visually indicate the changed cumulative motion control performed by the motion control operations in accordance with the user input;
>
> wherein said changing one or more of the motion control operations comprises changing the stored information.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding updating the displayed spatial trajectory in the preview window. Appellant also notes that there is no teaching or suggestion or reasonable expectation of success for combining Rowland's Dynamic Update in FIG. 4A with Compumotor, as proposed by the Examiner.

Inasmuch as claims 33 and 44 recite similar limitations as claim 2, Appellant respectfully submits that these claims are also patentably distinct over the cited references.

Claim 3

Claim 3 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein the first preview window comprises a window for previewing a velocity profile for the two or more motion control operations;
>
> wherein the method further comprises displaying velocity information in the first preview window for at least a portion of the motion control performed by the two or more motion control operations.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding the preview window displaying a velocity profile for the two or more motion control operations.

Claim 4

Claim 4 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein the first preview window comprises a window for previewing an acceleration profile for the two or more motion control operations;
>
> wherein the method further comprises displaying acceleration information in the first preview window for at least a portion of the motion control performed by the two or more motion control operations.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding the preview window displaying an acceleration profile for the two or more motion control operations.

Claim 5

Claim 5 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein the first preview window comprises a window for previewing position data for the two or more motion control operations in a two-dimensional view;
>
> wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises plotting two-dimensional position data in the first preview window to visually indicate at least a portion of the cumulative motion control performed by the two or more motion control operations in a two-dmensional view.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding the preview window displaying position data for the two or more motion control operations.

Claim 7

Claim 7 is separately patentable because the cited references do not teach or suggest the limitations of,

> dynamically updating the first preview window in response to selecting each of the two or more motion control operations to visually indicate the effect of selecting each operation;
>
> wherein, for each selected motion control operation, dynamically updating the first preview window in response to selecting the motion control operation comprises dynamically updating the displayed spatial trajectory to indicate a change in the cumulative motion control, wherein the change is caused by the selected motion control operation.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding dynamically updating the preview window in response to selecting each of the two or more motion control operations to visually indicate the effect of selecting each operation. Appellant also notes that there is no teaching or suggestion or reasonable expectation of success for combining Rowland's Dynamic Update in FIG. 4A with Compumotor, as proposed by the Examiner.

Claim 9

Claim 9 is separately patentable because the cited references do not teach or suggest the limitations of,

> receiving user input to configure one or more breakpoint operations to be performed in one or more of the motion control operations; and
>
> displaying information in the first preview window which visually indicates the one or more breakpoint operations.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding the preview window displaying information which visually indicates one or more breakpoint operations.

Claims 19 and 41

Claim 19 is separately patentable because the cited references do not teach or suggest the limitations of,

> for each of the one or more motion control operations that are configured via user input to the graphical user interface, updating the displayed spatial trajectory in response to configuring the motion control operation in order to indicate a change in the cumulative motion control caused by configuring the motion control operation.

As discussed above, the references fail to teach a preview window that displays a spatial trajectory indicating cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding updating the displayed spatial trajectory in response to configuring each motion control operation in order to indicate a change in the cumulative motion control caused by configuring the motion control operation.

Inasmuch as claim 41 recites similar limitations as claim 19, Appellant respectfully submits that this claim is also patentably distinct over the cited references.

Claim 25

Claim 25 is separately patentable because the cited references do not teach or suggest the limitations of,

> 25. (Original) The method of claim 24,
> wherein said creating program instructions for implementing the two or more motion control operations comprises programmatically generating at least a portion of a graphical program;
> wherein the graphical program includes a plurality of interconnected nodes that visually indicate functionality of the graphical program.

Compumotor teaches that the user manually arranges a plurality of icons but does not teach programmatically generating a plurality of icons when creating program instructions for implementing two or more motion control operations, as recited by claims 24 and 25.

Claim 31

Claim 31 is separately patentable because the cited references do not teach or suggest the limitations of,

> receiving user input to the first preview window to change the cumulative motion control performed by the two or more motion control operations;
> changing the program instructions to implement the changed motion control performed by the two or more motion control operations in response to the user input; and
> updating the second window to display the changed program instructions.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding receiving user input to the preview window to change the cumulative motion control performed by the two or more motion control operations.

Claim 34

Claim 34 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein said creating the sequence of motion control operations comprises receiving user input requesting to add each motion control operation to the sequence;

wherein the method further comprises dynamically updating the first preview window in response to each motion control operation added to the sequence to visually indicate the effect of adding the motion control operation, wherein updating the first preview window comprises updating the spatial trajectory to indicate a change in the cumulative motion control, wherein the change is caused by the added motion control operation.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding dynamically updating the first preview window in response to each motion control operation added to the sequence to visually indicate the effect of adding the motion control operation, wherein updating the first preview window comprises updating the spatial trajectory to indicate a change in the cumulative motion control, wherein the change is caused by the added motion control operation.

Claim 47

Claim 47 is separately patentable because the cited references do not teach or suggest the limitations of,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying an animation of the spatial trajectory.

As discussed above, the references fail to teach visually indicating a spatial trajectory cumulatively performed by two or more motion control operations. The references also do not teach displaying an animation of the spatial trajectory. With regard to this limitation, the Examiner cites FIG. 4A of Rowland, which displays the trajectory of a projectile that has been fired, not a preview of a spatial trajectory for two or more motion control operations. Furthermore, Rowland does not teach displaying an animation of the projectile trajectory.

Claim 48

Claim 48 is separately patentable because the cited references do not teach or suggest the limitations of,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying a graph with two or more spatial axes, wherein the spatial trajectory is displayed on the graph.

As discussed above, the references fail to teach visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations. Thus, the references also do not teach these additional limitations regarding displaying the spatial trajectory on a graph with two or more spatial axes.

Claim 49

Claim 49 is separately patentable because the cited references do not teach or suggest the limitations of,

wherein said receiving user input to the first preview window to graphically change the cumulative motion control performed by the two or more motion control operations comprises receiving user input to the displayed spatial trajectory to graphically change the cumulative motion control performed by the two or more motion control operations;

wherein the one or more motion control operations are changed in response to the user input to the displayed spatial trajectory.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations. In particular, claim 49 recites that user input is received to the displayed spatial trajectory in order to graphically change the cumulative motion control performed by the two or more motion control operations. Compumotor nowhere teaches the concept of receiving user input to a displayed trajectory in order to change the motion control performed by a motion control operation.

Claim 13

Claim 13 is separately patentable because the cited references do not teach or suggest the limitations of,

receiving user input specifying scale information regarding a desired scale at which to display the information in the first preview window; and

displaying the information in the first preview window at a scale in accordance with the specified scale information.

As discussed above, the references fail to teach a preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations. Appellant also notes that the Examiner has not cited any evidence of prior art teaching the limitations regarding the recited claim limitations, and thus, a *prima facie* case of obviousness has not been established.

Claims 6, 14-16, and 36-38 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Compumotor and Rowland in view of Roe. Appellant respectfully traverses these rejections.

Claim 6

Claim 6 recites as follows:

6. (Previously Presented) The method of claim 1,

wherein the first preview window comprises a window for previewing position data for the two or more motion control operations in a three-dimensional view;

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises plotting three-dimensional position data in the first preview window to visually indicate at least a portion of the cumulative motion control performed by the two or more motion control operations in a three-dmensional view.

The Examiner states that, "Compumotor-Rowland fails to distinctly point out a three dimensional view. However, Roe teaches a method for showing a motion control in a three dimensional view ([0083] lines 1-17)."

Appellant respectfully disagrees. Roe pertains generally to a method for defining and displaying a reservoir model, e.g., for modeling an oil or gas reservoir (Abstract). Roe is not related to the field of computer-based motion control and does not teach a method for showing motion control in a three dimensional view, as asserted by the Examiner. Appellant respectfully submits that the limitations recited in claim 6 are not taught by the cited references, taken either singly or in combination.

Appellant also submits that it is improper to rely on Roe as a basis for rejection of the present claims because Roe is not in the field of Appellant's endeavor (computer-based motion control) and is not reasonably pertinent to the particular problem with which the present inventors were concerned (previewing cumulative movement of two or more motion control operations).

Claims 14 and 36

Claim 14 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein said displaying information in the first preview window comprises displaying first information which visually indicates a first view of the cumulative motion control performed by the two or more motion control operations, wherein the first view displays a first view of the spatial trajectory cumulatively performed by the two or more motion control operations;
>
> wherein the method further comprises:
>
> displaying a second preview window for previewing the cumulative motion control performed by the two or more motion control operations; and
>
> displaying second information in the second preview window which visually indicates a second view of the cumulative motion control performed by the two or more motion control operations, wherein the second view displays a second view of the spatial trajectory cumulatively performed by the two or more motion control operations.

As discussed above, the references fail to teach a first preview window that displays cumulative motion control performed by two or more motion control operations. Thus, the references also do not teach these additional limitations regarding displaying a second preview window.

Inasmuch as claim 36 recites similar limitations as claim 14, Appellant respectfully submits that this claim is also patentably distinct over the cited references.

Claims 15 and 37

Claim 15 is separately patentable because the cited references do not teach or suggest the limitations of,

> wherein said displaying the first view of the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying two-dimensional position information visually indicating a two-dimensional view of at least a portion of the;

wherein said displaying the second view of the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying three-dimensional position information visually indicating a three-dimensional view of at least a portion of the spatial trajectory.

As discussed above, the references fail to teach displaying both a first view and a second view of the spatial trajectory cumulatively performed by two or more motion control operations. Also, as discussed above, the references also fail to teach displaying a three-dimensional view of at least a portion of the spatial trajectory.

Inasmuch as claim 37 recites similar limitations as claim 15, Appellant respectfully submits that this claim is also patentably distinct over the cited references.

Claims 16 and 38

Claim 16 is separately patentable because the cited references do not teach or suggest the limitations of,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises visually indicating a two-dimensional view of at least a portion of the spatial trajectory;

wherein the method further comprises displaying velocity information regarding the cumulative motion control performed by the two or more motion control operations.

The cited references do not teach these limitations for reasons similar to those set forth above. Inasmuch as claim 38 recites similar limitations as claim 16, Appellant respectfully submits that this claim is also patentably distinct over the cited references.

Claims 8, 11-12, and 35 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Compumotor and Rowland in view of U.S. Patent No. 6,298,474 to Blowers et al. (hereinafter "Blowers"). Appellant respectfully traverses these rejections.

Claim 8

Claim 8 is separately patentable because the cited references do not teach or suggest the limitations of,

receiving user input to configure one or more capture operations to be performed in one or more of the motion control operations; and

displaying information in the first preview window which visually indicates the one or more capture operations.

The Examiner states that, "Compumotor-Rowland fails to distinctly point out a method, which includes a capture operation. However, Blowers teaches a capture operation (Figure 2) to be performed in one or more of the motion control operations." However, Appellant disagrees that Blowers teaches a capture operation to be performed in one or more of the motion control operations. The cameras illustrated in FIG. 2 are operable to capture images, but this is not at all the same as receiving user input to configure one or more capture operations to be performed in one or more motion control operations. Appellant can find no teaching in Blowers regarding these limitations recited in claim 8.

Claims 11 and 35

Claim 11 is separately patentable because the cited references do not teach or suggest the limitations of,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises interactively tracing the spatial trajectory performed by the two or more motion control operations.

The Examiner asserts that these features are taught by Blowers at Col. 12, lines 57-60. However, this portion of Blowers reads as follows:

The user is allowed to single step through the central sequence for debug/setup purposes.

Individual steps may be bypassed in single step mode or commented out in run mode.

Appellant submits that this teaches nothing regarding interactively tracing the spatial trajectory performed by two or more motion control operations. As described in the present specification:

In another embodiment, the user may be able to request the motion control prototyping environment to simulate the motion trajectory such that the trajectory is interactively traced out in the preview window(s) as the user watches. For example, the preview window(s) may initially be empty (or may only display a coordinate grid), and the motion trajectory may gradually be

plotted in the preview window(s). This may help the user to understand how the motion control device moves through space over time. This type of simulation may aid the user in performing offline development and prototyping; in other words, the user may watch a simulation of the motion even if no motion control device is coupled to the computer system.

Neither Blowers nor the other references teach the concept of interactively tracing a spatial trajectory in this manner.

Inasmuch as claim 35 recites similar limitations as claim 11, Appellant respectfully submits that this claim is also patentably distinct over the cited references.

Claim 12

Claim 12 is separately patentable because the cited references do not teach or suggest the limitations of,

> receiving user input specifying rate information regarding a desired rate at which to trace the trajectory; and
>
> interactively tracing the trajectory performed by the two or more motion control operations at a rate in accordance with the specified rate information.

As described above, Blowers does not teach interactively tracing a spatial trajectory. Blowers also does not teach these additional limitations regarding receiving user input specifying rate information indicating a desired rate at which to trace the trajectory and interactively tracing the trajectory performed by the two or more motion control operations at a rate in accordance with the specified rate information.

VIII. CONCLUSION

For the foregoing reasons, it is submitted that the Examiner's rejection of claims 1-49 was erroneous, and reversal of the decision is respectfully requested.

The Commissioner is authorized to charge any fees that may be due to Meyertons, Hood, Kivlin, Kowert, & Goetzel, P.C. Deposit Account No. 501505/5150-64400/JCH.

Respectfully submitted,

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IX. CLAIMS APPENDIX

The following lists the claims as incorporating entered amendments, and as on appeal.

1. (Previously Presented) A computer-implemented method for previewing two or more motion control operations, the method comprising:

receiving user input selecting the two or more motion control operations, wherein the motion control operations are operable to perform motion control of a hardware device;

storing information representing the two or more motion control operations;

displaying a first preview window for previewing cumulative motion control performed by the two or more motion control operations; and

displaying information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations.

2. (Previously Presented) The method of claim 1, further comprising:

receiving user input to the first preview window to graphically change the cumulative motion control performed by the two or more motion control operations;

changing one or more of the motion control operations in order to change the cumulative motion control performed by the motion control operations in accordance with the user input; and

updating the displayed spatial trajectory in the first preview window in order to visually indicate the changed cumulative motion control performed by the motion control operations in accordance with the user input;

wherein said changing one or more of the motion control operations comprises changing the stored information.

3. (Original) The method of claim 1,

wherein the first preview window comprises a window for previewing a velocity profile for the two or more motion control operations;

wherein the method further comprises displaying velocity information in the first preview window for at least a portion of the motion control performed by the two or more motion control operations.

4. (Original) The method of claim 1,

wherein the first preview window comprises a window for previewing an acceleration profile for the two or more motion control operations;

wherein the method further comprises displaying acceleration information in the first preview window for at least a portion of the motion control performed by the two or more motion control operations.

5. (Previously Presented) The method of claim 1,

wherein the first preview window comprises a window for previewing position data for the two or more motion control operations in a two-dimensional view;

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises plotting two-dimensional position data in the first preview window to visually indicate at least a portion of the cumulative motion control performed by the two or more motion control operations in a two-dmensional view.

6. (Previously Presented) The method of claim 1,

wherein the first preview window comprises a window for previewing position data for the two or more motion control operations in a three-dimensional view;

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises plotting three-dimensional position data in the first preview window to visually indicate at least a portion of the cumulative motion control performed by the two or more motion control operations in a three-dmensional view.

7. (Previously Presented) The method of claim 1, further comprising:

dynamically updating the first preview window in response to selecting each of the two or more motion control operations to visually indicate the effect of selecting each operation;

wherein, for each selected motion control operation, dynamically updating the first preview window in response to selecting the motion control operation comprises dynamically updating the displayed spatial trajectory to indicate a change in the cumulative motion control, wherein the change is caused by the selected motion control operation.

8. (Previously Presented) The method of claim 1, further comprising:

receiving user input to configure one or more capture operations to be performed in one or more of the motion control operations; and

displaying information in the first preview window which visually indicates the one or more capture operations.

9. (Previously Presented) The method of claim 1, further comprising:

receiving user input to configure one or more breakpoint operations to be performed in one or more of the motion control operations; and

displaying information in the first preview window which visually indicates the one or more breakpoint operations.

10. (Previously Presented) The method of claim 1,

wherein said displaying information in the first preview window which visually indicates cumulative motion control performed by the two or more motion control operations comprises displaying information which visually indicates only a portion of the entire cumulative motion control performed by the two or more motion control operations.

11. (Previously Presented) The method of claim 1,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises interactively tracing the spatial trajectory performed by the two or more motion control operations.

12. (Original) The method of claim 11, further comprising:

receiving user input specifying rate information regarding a desired rate at which to trace the trajectory; and

interactively tracing the trajectory performed by the two or more motion control operations at a rate in accordance with the specified rate information.

13. (Original) The method of claim 1, further comprising:

receiving user input specifying scale information regarding a desired scale at which to display the information in the first preview window; and

displaying the information in the first preview window at a scale in accordance with the specified scale information.

14. (Previously Presented) The method of claim 1,

wherein said displaying information in the first preview window comprises displaying first information which visually indicates a first view of the cumulative motion control performed by the two or more motion control operations, wherein the first view displays a first view of the spatial trajectory cumulatively performed by the two or more motion control operations;

wherein the method further comprises:

displaying a second preview window for previewing the cumulative motion control performed by the two or more motion control operations; and

displaying second information in the second preview window which visually indicates a second view of the cumulative motion control performed by the two or more motion control operations, wherein the second view displays a second view of the spatial trajectory cumulatively performed by the two or more motion control operations.

15. (Previously Presented) The method of claim 14,

wherein said displaying the first view of the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying two-dimensional position information visually indicating a two-dimensional view of at least a portion of the;

wherein said displaying the second view of the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying three-dimensional position information visually indicating a three-dimensional view of at least a portion of the spatial trajectory.

16. (Previously Presented) The method of claim 1,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises visually indicating a two-dimensional view of at least a portion of the spatial trajectory;

wherein the method further comprises displaying velocity information regarding the cumulative motion control performed by the two or more motion control operations.

17. (Original) The method of claim 1,

wherein said receiving user input selecting the two or more motion control operations does not include receiving user input specifying programming language code to implement the two or more motion control operations.

18. (Original) The method of claim 1, further comprising:

displaying a graphical user interface (GUI) that provides GUI access to a set of motion control operations;

wherein said receiving user input selecting the two or more motion control operations comprises receiving user input to the graphical user interface selecting the two or more motion control operations.

19. (Previously Presented) The method of claim 18, further comprising:

receiving user input to the graphical user interface for configuring one or more of the selected motion control operations, wherein, for each of the one or more motion control operations that are configured via user input to the graphical user interface, said configuring the motion control operation affects motion control which the motion control operation is operable to perform;

wherein the method further comprises:

for each of the one or more motion control operations that are configured via user input to the graphical user interface, updating the displayed spatial trajectory in response to configuring the motion control operation in order to indicate a change in the cumulative motion control caused by configuring the motion control operation.

20. (Original) The method of claim 19,

wherein said receiving user input to the graphical user interface for configuring one or more of the selected operations does not include receiving user input specifying programming language code to configure the operations.

21. (Original) The method of claim 19, further comprising:

for each operation to be configured, displaying a graphical panel including graphical user interface elements for setting properties of the operation and receiving user input to the graphical panel to set one or more properties of the operation.

22. (Original) The method of claim 1,

wherein said storing information representing the two or more motion control operations comprises storing a motion control sequence comprising the two or more motion control operations.

23. (Original) The method of claim 1,

wherein said storing information regarding the two or more motion control operations comprises storing a prototype comprising the two or more motion control operations.

24. (Original) The method of claim 1,

wherein said storing information regarding the two or more motion control operations comprises creating program instructions for implementing the two or more motion control operations.

25. (Original) The method of claim 24,

wherein said creating program instructions for implementing the two or more motion control operations comprises programmatically generating at least a portion of a graphical program;

wherein the graphical program includes a plurality of interconnected nodes that visually indicate functionality of the graphical program.

26. (Original) The method of claim 25,

wherein said programmatically generating the at least a portion of the graphical program comprises including one or more nodes in the graphical program operable to implement the two or more motion control operations.

27. (Original) The method of claim 25, further comprising:

executing the graphical program to perform the two or more motion control operations.

28. (Original) The method of claim 25,

wherein the graphical program is a graphical data flow program.

29. (Original) The method of claim 24,

wherein said creating program instructions for implementing the two or more motion control operations comprises generating at least a portion of a text-based program;

wherein said generating the at least a portion of the text-based program includes generating a plurality of function calls operable to implement the two or more motion control operations.

30. (Original) The method of claim 24, further comprising:

displaying the created program instructions in a second window.

31. (Previously Presented) The method of claim 30, further comprising:

receiving user input to the first preview window to change the cumulative motion control performed by the two or more motion control operations;

changing the program instructions to implement the changed motion control performed by the two or more motion control operations in response to the user input; and

updating the second window to display the changed program instructions.

32. (Previously Presented) A computer-implemented method for previewing a sequence of motion control operations, the method comprising:

creating the sequence of motion control operations, wherein the sequence of motion control operations comprises one or more operations operable to perform motion control of a hardware device;

displaying a first preview window for previewing cumulative motion control performed by the sequence of motion control operations; and

displaying information in the first preview window which visually indicates the cumulative motion control performed by the sequence of motion control operations, wherein visually indicating the cumulative motion control performed by the sequence of motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the sequence of motion control operations.

33. (Previously Presented) The method of claim 32, further comprising:

receiving user input to the first preview window to graphically change the cumulative motion control performed by the sequence of motion control operations;

changing one or more motion control operations in the sequence in order to change the cumulative motion control performed by the sequence in accordance with the user input; and

updating the displayed spatial trajectory in the first preview window in order to visually indicate the changed cumulative motion control performed by the sequence motion control operations in accordance with the user input.

34. (Previously Presented) The method of claim 32,

wherein said creating the sequence of motion control operations comprises receiving user input requesting to add each motion control operation to the sequence;

wherein the method further comprises dynamically updating the first preview window in response to each motion control operation added to the sequence to visually indicate the effect of adding the motion control operation, wherein updating the first preview window comprises updating the spatial trajectory to indicate a change in the cumulative motion control, wherein the change is caused by the added motion control operation.

35. (Previously Presented) The method of claim 32,

wherein said visually indicating the spatial trajectory cumulatively performed by the sequence of motion control operations comprises interactively tracing the spatial trajectory performed by the sequence of motion control operations.

36. (Previously Presented) The method of claim 32,

wherein said displaying information in the first preview window comprises displaying first information which visually indicates a first view of the cumulative motion control performed by the sequence of motion control operations, wherein the first view displays a first view of the spatial trajectory cumulatively performed by the sequence of motion control operations;

wherein the method further comprises:

displaying a second preview window for previewing the cumulative motion control performed by the sequence of motion control operations; and

displaying second information in the second preview window which visually indicates a second view of the cumulative motion control performed by the sequence of motion control operations, wherein the second view displays a second view

of the spatial trajectory cumulatively performed by the sequence of motion control operations.

37. (Previously Presented) The method of claim 36,

wherein said displaying the first view of the spatial trajectory cumulatively performed by the sequence of motion control operations comprises displaying two-dimensional position information visually indicating a two-dimensional view of at least a portion of the spatial trajectory;

wherein said displaying the second view of the spatial trajectory cumulatively performed by the sequence of motion control operations comprises displaying three-dimensional position information visually indicating a three-dimensional view of at least a portion of the spatial trajectory.

38. (Previously Presented) The method of claim 32,

wherein said visually indicating the spatial trajectory cumulatively performed by the sequence of motion control operations comprises visually indicating a two-dimensional view of at least a portion of the spatial trajectory;

wherein the method further comprises displaying velocity information regarding the cumulative motion control performed by the sequence of motion control operations.

39. (Original) The method of claim 32,

wherein said creating the sequence of motion control operations does not include receiving user input specifying programming language code to implement the sequence of motion control operations.

40. (Original) The method of claim 32, further comprising:

displaying a graphical user interface (GUI) that provides GUI access to a set of motion control operations;

wherein said creating the sequence of motion control operations comprises receiving user input to the graphical user interface specifying operations to include in the sequence of motion control operations.

41. (Previously Presented) The method of claim 40, further comprising:

receiving user input to the graphical user interface for configuring one or more of the motion control operations in the sequence, wherein, for each of the one or more motion control operations that are configured via user input to the graphical user interface, said configuring the motion control operation affects motion control which the motion control operation is operable to perform;

wherein said receiving user input to the graphical user interface for configuring the one or more of the motion control operations in the sequence does not include receiving user input specifying programming language code to configure the one or more motion control operations;

wherein the method further comprises:

for each of the one or more motion control operations that are configured via user input to the graphical user interface, updating the displayed spatial trajectory in response to configuring the motion control operation in order to indicate a change in the cumulative motion control caused by configuring the motion control operation.

42. (Original) The method of claim 41, further comprising:

for each operation to be configured, displaying a graphical panel including graphical user interface elements for setting properties of the operation and receiving user input to the graphical panel to set one or more properties of the operation.

43. (Previously Presented) A memory medium for previewing two or more motion control operations, the memory medium comprising program instructions executable to:

receive user input selecting the two or more motion control operations, wherein the motion control operations are operable to perform motion control of a hardware device;

store information representing the two or more motion control operations;

display a first preview window for previewing cumulative motion control performed by the two or more motion control operations; and

display information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations.

44. (Currently Amended) The memory medium of claim 43, further comprising program instructions executable to:

receive user input to the first preview window to graphically change the cumulative motion control performed by the two or more motion control operations;

change one or more of the motion control operations in order to change the cumulative motion control performed by the motion control operations in accordance with the user input; and

updating the displayed spatial trajectory in the first preview window in order to visually indicate the changed cumulative motion control performed by the motion control operations in accordance with the user input;

wherein said changing one or more of the motion control operations comprises changing the stored information.

45. (Previously Presented) A system for previewing two or more motion control operations, the system comprising:

a processor;

a memory storing program instructions;

a display device;

a motion control device;

wherein the processor is operable to execute the program instructions stored in the memory to:

receive user input selecting the two or more motion control operations, wherein the motion control operations are operable to control the motion control device;

store information representing the two or more motion control operations;

display a first preview window on the display device for previewing cumulative motion control performed by the two or more motion control operations; and

display information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations.

46. (Previously Presented) A system for previewing two or more motion control operations, the system comprising:

a motion control device;

means for receiving user input selecting the two or more motion control operations, wherein the motion control operations are operable to control the motion control device;

means for storing information representing the two or more motion control operations;

means for displaying a first preview window for previewing cumulative motion control performed by the two or more motion control operations; and

means for displaying information in the first preview window which visually indicates the cumulative motion control performed by the two or more motion control operations, wherein visually indicating the cumulative motion control performed by the two or more motion control operations comprises visually indicating a spatial trajectory cumulatively performed by the two or more motion control operations.

47. (Previously Presented) The method of claim 1,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying an animation of the spatial trajectory.

48. (Previously Presented) The method of claim 1,

wherein said visually indicating the spatial trajectory cumulatively performed by the two or more motion control operations comprises displaying a graph with two or more spatial axes, wherein the spatial trajectory is displayed on the graph.

49. (Previously Presented) The method of claim 2,

wherein said receiving user input to the first preview window to graphically change the cumulative motion control performed by the two or more motion control operations comprises receiving user input to the displayed spatial trajectory to graphically change the cumulative motion control performed by the two or more motion control operations;

wherein the one or more motion control operations are changed in response to the user input to the displayed spatial trajectory.

X. EVIDENCE APPENDIX

No evidence submitted under 37 CFR §§ 1.130, 1.131 or 1.132 or otherwise entered by the Examiner is relied upon in this appeal.

XI. RELATED PROCEEDINGS APPENDIX

There are no related proceedings.